

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
23 September 2004 (23.09.2004)

PCT

(10) International Publication Number
WO 2004/080933 A3

(51) International Patent Classification⁷: C07C 403/08, (74) Agents: STEFFEY, Charles, E. et al.; Schwegman, Lundberg, Woessner & Kluth, P.A., P.O. Box 2938, Minneapolis, A23K 1/16, A23L 1/03, A61K 7/00, 31/07, A61P 1/04, MN 55402 (US). 35/00, 9/00, 27/02

(21) International Application Number:
PCT/US2004/006721

(22) International Filing Date: 5 March 2004 (05.03.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/452,565 7 March 2003 (07.03.2003) US
10/688,776 17 October 2003 (17.10.2003) US
10/696,730 29 October 2003 (29.10.2003) US

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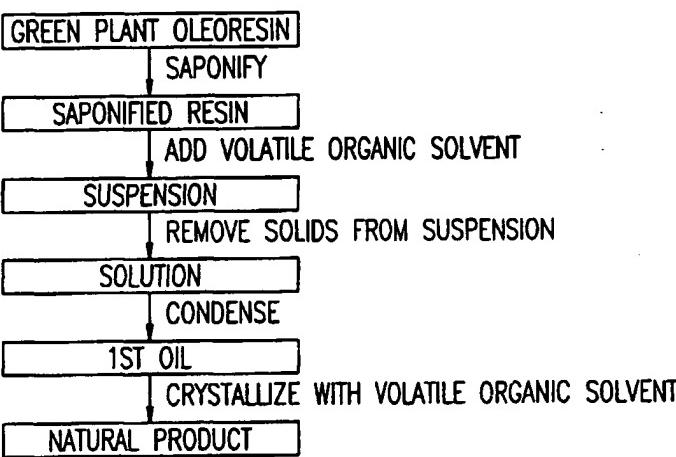
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(54) Title: ISOLATION OF LUTEIN FROM ALFALFA



(57) Abstract: The present invention provides a process for an industrial scale extraction and purification of xanthophylls (e.g., lutein and zeaxanthin) from plant material (e.g., alfalfa or other leafy green crops having high levels of chlorophyll). The process involves harvesting lutein rich alfalfa, extracting an oleoresin from the alfalfa leaves, saponifying the oleoresin, extracting and extracting lutein using a series of solvent extractions specific for oleoresin obtained from alfalfa or other leafy green plants.

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US2004/006721

A. CLASSIFICATION OF SUBJECT MATTER					
IPC 7	C07C403/08	A23K1/16	A23L1/03	A61K7/00	A61K31/07
	A61P1/04	A61P35/00	A61P9/00	A61P27/02	

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C A23K A23L A61K A61P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal, BEILSTEIN Data, WPI Data, PAJ, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 382 714 A (F. KHACHIK) 17 January 1995 (1995-01-17)	1-14, 17-71, 95,96,98
Y	claim 5; examples 1,2; table I	15,16
A	US 6 329 557 B1 (G. RODRIGUEZ, ET AL.) 11 December 2001 (2001-12-11)	1-71,95, 96,98
Y	column 4, line 9 - line 20; claim 12	15,16
Y	US 6 504 067 B1 (R. MONTOYA-OLVERA, ET AL.) 7 January 2003 (2003-01-07) column 1, line 43 - line 52	15,16
Y	US 6 376 722 B1 (V.E. RIDAURA SANZ, ET AL.) 23 April 2002 (2002-04-23) column 6, line 66 - column 7, line 5; claims 1,3	15,16

	-/-	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

31 August 2004

Date of mailing of the international search report

01 12 2004

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORTInternational Application No
PCT/US2004/006721**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 044 954 A (INDUSTRIAL ORGANICA) 18 October 2000 (2000-10-18) claims 1-5 -----	15,16

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/006721

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-72,95,96,98

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-72, 95, 96, 98

Natural product and a method for obtaining it

2. claims: 73-76 (in part), 86, 97 (in part)

Use of a natural product in the treatment of an ulcer

3. claims: 73-76 (in part), 87, 97 (in part)

Use of a natural product in the treatment of cancer

4. claims: 73-76 (in part), 88, 97 (in part)

Use of a natural product in the treatment of heart disease

5. claims: 73-76 (in part), 89, 97 (in part)

Use of a natural product in the treatment of macular degeneration

6. claims: 77-80

Neutraceutical formulation comprising a natural product

7. claims: 81-85

Cosmetic composition comprising a natural product

8. claims: 90-94

Dietary supplement comprising a natural product

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US2004/006721

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